Community Medicine Management for Childhood Malaria in Zambia June 2003: Assessment Report

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About RPM Plus

The Rational Pharmaceutical Management (RPM) Plus Program, funded by the U.S. Agency for International Development (cooperative agreement number HRN-A-00-00-00016-00), works in more than 20 developing countries to provide technical assistance to strengthen medicine and health commodity management systems. The program offers technical guidance and assists in strategy development and program implementation both in improving the availability of health commodities—pharmaceuticals, vaccines, supplies, and basic medical equipment—of assured quality for maternal and child health, HIV/AIDS, infectious diseases, and family planning and in promoting the appropriate use of health commodities in the public and private sectors.

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ACRONYMS

ACT	artemisinin-based combination therapy
CBOH	Central Board of Health
CDC	U.S. Centers for Disease Control and Prevention
C-DMCI	Community Drug Management for Childhood Illnesses
C-DMM	Community Drug Management for Malaria
CHW	community health worker
CQ	chloroquine
DOTS	Directly Observed Treatment, Short-course
GRZ	Government of the Republic of Zambia
IEC	information, education, and communication
IMCI	Integrated Management of Childhood Illness
ITG	Integrated Treatment Guidelines
MOH	Ministry of Health
MSH	Management Sciences for Health
NMCC	National Malaria Control Centre
NGO	nongovernmental organization
PHC	primary health care
RBM	Roll Back Malaria Partnership
RPM Plus	Rational Pharmaceutical Management Plus Program
SP	sulfadoxine-pyrimethamine
USAID	U.S. Agency for International Development
WHO	World Health Organization

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INTRODUCTION

Background

Malaria is a leading cause of morbidity and mortality in Zambia. Statistics (CBOH/NMCC 2001b) show that more than 40 percent of hospital deaths and 60 percent of hospital admissions are due to malaria. In addition, 20 percent of all pregnancy-related deaths are caused by malaria; a high percentage of pediatric outpatient consultations and hospital admissions are also malaria-related (Dlamini et al. 2004). Malaria also constitutes more than 20 percent of outpatient hospital attendance overall. Malaria is endemic across the country, with the hot river valleys reporting hyperendemic perennial transmission and the plateaus and urban areas showing meso- to hypoendemic and hypoendemic transmission, respectively. Malaria is the most significant public health problem in the country, with 95 percent of the cases caused by *Plasmodium falciparum,* 3 percent by *P. malariae,* and 2 percent by *P. ovale.*

According to health information from the public institutions, there is an upward trend in the morbidity and mortality rates. From 1996 to 1999, the incidence rate for malaria increased from 121.5 to 308 per 1,000 population. A similar trend was observed for mortality rates—an increase in death rate of 10.6 to 27.4 per 1,000 was reported between 1976 and 1989. The proportion of malaria cases admitted into hospitals that ended in death rose from 38.8 per 1,000 in 1990 to 51.3 per 1,000 in 1994. Children under five accounted for 45.7 percent of admissions and 48.6 percent of deaths in 1993 (MOH 2001). The increase in morbidity and mortality rates has been attributed to the development of resistance to chloroquine (CQ) (which began in 1982) and sulfadoxine-pyrimethamine (SP) (CBOH/NMCC 2001a; Dlamini et al. 2004).

The National Malaria Control Centre (NMCC), in collaboration with the World Health Organization (WHO) and the U.S. Centers for Disease Control and Prevention (CDC), has undertaken studies since the 1980s to assess the efficacy of medicines used for the treatment of malaria, particularly in children under five years. The methodology was based on WHO guidelines. The studies found that total clinical resistance for CQ ranged between 24 percent and 54 percent. At the time of these studies, WHO guidelines recommended a change in the first-line medicine once total clinical resistance reaches 25 percent (this has now been revised to 15 percent clinical resistance). WHO now recommends that countries changing their first-line treatment policies for malaria change to artemisinin-based combination therapies (ACT) (WHO 1999).

In November 2001, the Ministry of Health (MOH) revised its first-line treatment policy for treatment of malaria in Zambia from CQ to ACT. The ACT selected for the treatment of uncomplicated malaria was artemether-lumefantrine (Coartem). The new treatment policy was developed by the MOH and CBOH in collaboration with WHO's Roll Back Malaria (RBM) Department. Implementation of the new policy was to be phased in, and starting with selected districts. Where artemether-lumefantrine would not be available yet, SP remained the medicine of first choice for uncomplicated malaria. Additionally, for children under two years (children under 10 kg) and for expectant mothers, SP was the recommended first-line medicine until such a time that the safety profile of artemether-lumefantrine had been evaluated in this group.

Quinine was the recommended medicine for severe malaria. Patients with severe malaria were to be immediately referred to the nearest hospital after the first dose of quinine was given.

WHO has negotiated a subsidized price for artemether-lumefantrine (Coartem) with the manufacturer, Novartis, of 2.40 U.S. dollars (USD) for an adult treatment course available only to the public sector of malaria endemic countries. Médecins Sans Frontières provided enough artemether-lumefantrine to the Government of Zambia to cover seven pilot districts. The goal was to have 28 pilot districts of 72 total districts by the end of 2004. In the private retail pharmacies artemether-lumefantrine costs USD 12 per adult treatment course. At that rate, even at the subsidized price, artemether-lumefantrine was still considered expensive when compared with the price of CQ, which was USD .20 per treatment course. Without external support for financing the new treatment, the Government of Zambia would not be able to implement its new policy. In 2002, Zambia was awarded a grant by the Global Fund to Fight AIDS, Tuberculosis and Malaria for scaling up its malaria program, including the procurement of ACTs for the public sector.

Community Perceptions of Malaria

The NMCC has conducted several studies on community attitudes, knowledge, and behavioral practices. These studies have demonstrated that people living in the communities are able to recognize the signs and symptoms of malaria and are equally familiar with some of the preventive measures. However, misconceptions have been reported on the perceived causes of malaria such as: eating leftover food, being soaked by rain, drinking dirty water, and even witchcraft, particularly for convulsions. People living in communities were aware that CQ and SP are used to treat malaria (CBOH 2003).

In 2002, RPM Plus conducted a study on community health workers (CHWs) and community perception of SP. The perceptions of the community were that children below five years should not be given the medicine. The CHWs also perceived that a second course of treatment could not be given immediately and patients would need to wait one to six months before another course of treatment with SP could be taken.

Purpose of the Study

The availability, appropriate management, and rational use of medicines are critical to the successful implementation of the Integrated Management of Childhood Illness (IMCI) strategy, which includes malaria as a key area of emphasis. Because the majority of cases are treated in the home or by private medicine providers and not in health facilities, it is important that efforts be focused on ensuring that correct treatment is available near the home and that families seek, obtain, and appropriately use essential medicines, whether from public or private sources. There is, however, a dearth of information on medicine use practices at the community level that would help health planners and decision makers to design appropriate and effective interventions for improving rational use in Zambia. In order to design effective interventions for malaria treatment

in the community, there is a need to understand the community health-seeking behaviors and the use and management of medicines for the treatment of malaria. The aim of this study is to understand the health-seeking behavior and malaria medicine use practices in the Zambian community. Lessons learned would be used to plan interventions to ensure effective implementation of the new malaria treatment policy.

The principal aims of the community survey in Zambia were to—

1. Identify the strengths and weaknesses of community medicine management for childhood malaria in the five districts surveyed

2. Orient the development of interventions and planning of activities for strengthening community management of malaria

METHODOLOGY

In response to an expression of need by the NMCC, the USAID Mission provided funds to the RPM Plus Program to conduct a study to assess the availability and use of antimalarial medicines in the community, particularly for children under five years, in partnership and collaboration with the NMCC, the Information Education and Communication (IEC) Department, and the RBM Working Committee.

A research team composed of staff from the NMCC, CBOH, and RPM Plus worked together to plan the assessment. RPM Plus coordinated the research process based on the guidelines provided in the publication, *Community Drug Management for Childhood Illness (C-DMCI): Assessment Manual* (Nachbar et al. 2003). Other processes that were coordinated by RPM Plus include the logistics, background information, planning of meetings, training, recruitment of data collectors and supervisors, revision and production of the survey instruments, and supervision and quality control of the data collection and analysis processes. Budgeting and contracts responsibilities were also overseen by RPM Plus.

Community Drug Management for Malaria Tool

The Community Drug Management for Malaria (C-DMM) assessment is an indicator-based tool developed by RPM Plus and was field-tested previously in Zambia. It has two main components: one for use at medicine outlets or health providers and one for use at the household level with the primary caregivers of recently sick children. An accompanying C-DMCI manual accompanies the tool and incorporates all the IMCIs. The manual outlines the detailed methodology for conducting the survey.

The study was carried out in June 2003 by data collectors in the five districts, using both components of the C-DMM to administer the questions to 1,875 caregivers in the households and 189 health care providers in the facilities.

Household Survey

The household-level component of the tool addressed timeliness of treatment, sources of medication, choice of medicines, appropriateness of medicine use, and perceived access to certain medicines. This questionnaire was administered to caregivers/parents/guardians of children who had experienced symptoms of uncomplicated and severe malaria—fever or convulsions—in the two weeks prior to the survey. Only caregivers of those children who had recovered from their episode of illness were eligible to participate. Questions were asked about the recent episode of illness, the caregiver's actions, and the medicines the child took. To identify the medicines, the caregivers were asked to recall the name or to show the packaging of the medicine used for the sick child. To obtain information about perceptions of access, general questions unrelated to the recent episodes were asked, using the commonly known names of the

medicines under study. Information on the medicines used and their commonly used names was collected prior to the study.

Information collected from the caregivers included data on—

- The timeliness of their care seeking
- The facilities that were used for care and purchase of medicines
- Medicines they obtained and how they used them

Medicine Provider Survey

The provider/medicine outlet–level component of the tool focused on appropriateness of treatment by providers (i.e., medicine choice for prescription, sale, or referral), using hypothetical scenarios involving sick children and questions about stock movement, medicine availability, and dispensing. This questionnaire was administered to medicine sellers and health care providers in both the formal and informal sector.

Health care providers included in the survey consisted of—

- Health personnel from public health facilities
- Health personnel from licensed retail medicine outlets (pharmacies)
- Staff of unlicensed retail outlets (drug shops, general stores, kiosks)
- Authorized individuals dispensing medicines
- Unlicensed individuals dispensing medicines (such as traditional healers)

The administration of the two components of the tool generated indicators that were used for identifying problems and eventually for measuring change after implementation of interventions.

RPM Plus and the NMCC reviewed the C-DMM tools in the C-DMCI manual and adapted them to be administered in the districts selected for the survey in Zambia. The team used the available malaria treatment protocols to constitute the national standards of treatment. *The Zambia Integrated Treatment Guidelines for Frontline Health Workers* (ITG) (MOH 2004) and the then draft of the *Standard Treatment Guidelines* for Zambia were used as reference materials (MOH/CBOH 2002). The team also developed evaluation standards for each indicator as provided in the guidance manual.

Data Collection and Data Analysis Team

The research team trained health management information system officers and clinical managers from Lusaka, Kabwe, Chipata, Chingola, and Senanga to serve as field data analysts and supervisors, respectively. Schoolteachers were recruited as data collectors.

- Field data supervisors: The roles of the field supervisors included planning and managing daily data collection activities and supervision of data collectors. The supervisors trained

with the data collectors. However, they were also given extra training on supervision on day three while the data collectors were doing their practice sessions. They were further contracted to obtain consent from district and community leaders to conduct the study, cluster the study sites, assign, supervise and provide feedback to the data collectors to sites, assess progress on data collection process and review the completeness of the questionnaires, liaise with community on problem solving, store completed questionnaires, and provide a written report on the data collection process.

- Field data analysts: The role of the field data analysts was to collate, tabulate, and analyze the collected data. The field data analysts analyzed data manually and were asked to calculate each of the indicators as provided in the C-DMCI manual. The coordinator assisted to produce tables, charts, and graphs to present the data. Field data analysts also participated in the data collection training, with additional training in data analysis while data collectors were piloting the instrument. An additional data analyst was recruited to design a software package (based on Microsoft Access) for entry of all collected data and also to work with the research coordinator to tabulate, analyze, and disseminate the research findings.

- Data collectors: In each district, schoolteachers were chosen to be data collectors and administer the survey. They were chosen because of their respected role in the community and because they would not bring any bias to the data process, not being an integral part of the health community. RPM Plus took advantage of the availability of the teachers recruited in the Lusaka District who participated in the piloting of the C-DMCI tool development in January 2002. Additional teachers were invited to join the team. The training of data collectors took place in Lusaka and was conducted between May 7 and 9, 2003. The data collectors trained in the pilot phase were assigned to provide peer review to the new recruits. The data collectors were trained with the field supervisors and field data analysts to create sampling clusters, identify households and medicine outlets, and select respondents according to the established criteria in both urban and rural settings. They were trained to administer the surveys to respondents, record the responses, and discuss the data with the supervisors before handing over the completed surveys.

  While forming the data collection teams, the individual peculiarity of each study site was taken into consideration. For example: knowledge of the local language of a certain site was a key factor in choosing data collectors for that site, so that Silozi-speaking data collectors were assigned to the Senanga (Silozi-speaking) District. The team pre-tested the tool and data collection techniques in Lusaka, and lessons learned were used to finalize the questionnaires.

The research team of field supervisors, field analysts, and data collectors all participated in the daily debriefing of the data collection process, which also included an assessment of the preliminary results provided by the field data analysts.

The district staff was invited to travel to Lusaka to participate in data analysis and present their findings.

Authorization Letter

To conduct the study, the NMCC wrote a letter to the CBOH Director of Public Health and Research for permission. When permission was granted, the team drafted a letter for the director to request the district directors of health to send the selected personnel to serve as data collector supervisors as well as data analysts. The district clinical care managers were selected as supervisors, and data information officers were invited to serve as data analysts.

On completion of the training, another authorization letter was provided to the district directors of health, with copies to the provincial directors of health, for permission to conduct the study. The data collectors were also given letters to show that they were authorized by the CBOH management.

Selection of Sites

Malaria incidences increase during the rainy season, which starts in late October and continues through April. The study was conducted in June 2003. The NMCC provided guidance in the selection of districts where the study was to be conducted. Five of the 72 districts were purposefully selected, based on the following criteria—

- Urban or rural settings
- Sentinel sites where a number of antimalarial medicine efficacy studies have recently been carried out
- Access to public health information
- Existence of formal and informal medicine outlets
- Participation in the pilot implementation of the new first-line medicine of choice artemether-lumefantrine
- Proximity to the bordering countries where there are alternate antimalarial medicines

At the district level, the supervisors trained were asked to select the clusters based on the criteria provided in the manual. The key guiding factors included population distribution, geographical location, and good infrastructure at the site. The sample size needed in each district was 300 caregivers (15 from 20 clusters) and 20 providers per type of outlet. The supervisors created the clusters. The study was conducted in urban and rural settings in the following districts—

- Chipata is a periurban setting that was chosen to represent the 11 sentinel sites. It is more densely populated than the other sites; therefore, a large percentage of the population was left out. As a result of its proximity to the border with Malawi, there are quite a number of antimalarial medicines available in the district. This includes SP, which until recently was the first-line medicine for treatment of malaria in Malawi. The District Health Management Board for Chipata has five working zones, which were subdivided into

three zones (rural, periurban, and urban settings). Kapata has both rural and urban settings. The other four (Mkanda, Chikando, Kasenengwa, and Chiparamba) are rural settings. Three hundred households from 20 clusters were selected from the zones according to the population split and 39 different types of medicine outlets were visited within seven days of the survey.

- Kabwe is an urban setting that participates in the artemether-lumefantrine pilot scheme. It also has a number of nongovernmental organizations (NGOs) and media outlets. However, there is a limited number of private formal and informal medicine outlets. Kabwe has a population of 181,031 and is divided into 13 administrative health zones based on location of health facilities and population densities that the District Health Management Board utilizes. Using data sampling techniques, 10 out of 13 zones were selected at random. The 10 zones serve 77 percent of the total population of Kabwe. Based on the MOH data on the population densities, the data collection team selected 20 clusters to conduct the assessment. A total of 305 households were interviewed (15 per cluster). However, most of the providers at the medicine outlets misrepresented the actual situation and attempted to portray the ideal situation as opposed to the real situation. Artemether-lumefantrine was often referred to as the "new chloroquine." Kabwe District is using the recommended lines of treatment, and both the community and the health staff are aware of this. Medicines are available and the district has adopted the Directly Observed Treatment, Short-course (DOTS) principle of administering SP to patients and pregnant women (for intermittent preventive treatment) in order to ensure they take the medicines, despite existing misconceptions about the medicine. The community is using established health facilities but underusing the CHWs. The knowledge needed for early detection of symptoms is high and the majority of respondents seek treatment from medical professionals, although a high proportion of residents purchase treatment through medicine vendors. The private sector, however, needs to be strictly advised and monitored in order to ensure a "chloroquine-free" Kabwe District.

- Lusaka is the capital city in an urban setting that has benefited from a number of projects, including the artemether-lumefantrine pilot scheme and other projects involving insecticide-treated nets. The respondents have the potential to be more informed. Lusaka also benefits from the existence of formal and informal antimalarial medicine outlets. The Lusaka Urban District Health Management Board divides the district into eight health administrative zones. Each zone uses health centers as reference focal points. The clustering process was done using the health centers as reference points for the 20 clusters based on the population distribution of 1.2 million people. In each cluster, 15 households and 3 medicine outlets were surveyed, bringing the total to 315 households and 60 medicine outlets visited, respectively.

  Most of the medicine outlets in Lusaka had expired medicines. Quinine was not very popular even among CHWs (few medicine outlets had quinine). SP was considered too strong for younger children. CQ was very common in the health centers, and most CHWs are still prescribing this.

- Chingola is an urban setting located in the Copperbelt mining area. It is a key beneficiary of the Konkola Copper mining company antimalarial indoor spraying program. Chingola is divided into three zones: Chawama (population 27,018), Nchangutha (population 5,304), and Lulamba (population 9,003). Nchangutha and Lulamba are rural settings. However, the selection of clusters was based on the ratio population densities, using health clinics as reference points.

  There have been a number of awareness programs on the need for preventive care for malaria. Most of the hospitals in Chingola have changed their policy and are using SP. The public health services are underused because of medicine stock-outs and negative attitudes of the health care providers (nurses).

- Senanga, a rural district with limited access to the media or other IEC materials, has a population of 115,000 and is divided into 14 health zones. At the time the survey was conducted, only eight zones—Senanga Central, Litambya, Itufa, Lui River, Litoya, Likuma, Muoyo, and Kataba—with a total population of 62,597 people, were easily accessible. The other sites were generally flooded and sandy. The eight zones were divided into 20 clusters, with 303 households and 18 medicine outlets assessed. In Senanga, all cases of fever were considered to be malaria. One of the health care workers interviewed was a traditional healer.

Table 1 is a summary of the various districts with reference to the different criteria used.

Table 1. Distribution and Description of Districts

Criteria	District				
	Chingola	**Chipata**	**Kabwe**	**Lusaka**	**Senanga**
Rural					✓
Urban	✓		✓	✓	
Artemether-lumefantrine	✓			✓	
Information access			✓	✓	
Sentinel		✓			
Formal outlets			✓	✓	
Informal outlets	✓	✓	✓	✓	

Selection of Sites

Household Survey

On arriving, the data collectors spread out to different points to ensure a representative selection of households. For example, one data collector would start from the center and others would start from different peripheral points. They would randomly select a household from which to start

their selection process. The data collectors counted five houses before entering a home to see if there was an eligible child. The children included in the survey had to meet certain criteria—

- The child had undergone fever during the last two weeks
- The child was no longer sick
- The illness had not lasted longer than four weeks

If there was an eligible child, the data collectors conducted an interview with the primary caregiver of that child. If there was no eligible child, the data collectors would continue searching house-to-house until they found an eligible child. On completing the interview, the data collector would count five houses again and resume the process.

Medicine Outlet Survey

The data collectors were trained on how to collect data from the medicine outlets. They were asked to survey at least two outlets in each cluster. The selection of the type of outlet depended on the type available. These included public (owned by the government), faith based, private clinic, pharmacy, drug shops, CHWs, or other authorized or unauthorized outlets. In addition to the outlets identified in the household survey and the known public and mission drug outlets, on arrival in the community, community members were asked where they usually obtain medicines for their children. These outlets were then added to the sample frame from which the outlets to be surveyed were to be selected randomly. Outlets were only included in the survey if they were accessible at the time of the assessment.

FINDINGS

Profile of the Survey Participants

In the household survey there were a total of 1,605 household survey participants (caregivers). Table 2 shows the demographic features of the participants.

Table 2. Ages of Children Included in the Household Survey

Ages	Percentage (n=1,599)
0–less than 1 year (n=284)	18
1–2 years (n=408)	25
2–3 years (n=376)	22
3–4 years (n=366)	18
4–5 years (n=441)	17

As indicated in Table 2, the sample of children under five years was divided almost evenly across the age ranges. The sample was split equally between male (50 percent) and female (50 percent).

The majority of children (90 percent) were reported to have had fever/hot body as the initial symptom for malaria; another symptom was convulsions or fits, which occurred in less than 10 percent of the cases reported. Other symptoms were reported in five percent of the cases. Table 3 shows a breakdown of the symptoms reported by the caregivers.

Table 3. Symptoms Reported by Caregivers of Children under Five Years

Symptoms	(n=1,599)	Percentage
Fever/hot body	1,437	90
Convulsions/fits	75	5
Both fever and convulsions	87	5

The distribution of the different types of providers of medicines varied across the medicine outlets included in the survey. As shown in the Table 4, 189 providers were surveyed in all five districts.

Table 4. Distribution of Medicine Outlets, by District

District	Number of Outlets
Chipata	39
Chingola	48
Kabwe	24
Lusaka	60
Senanga	18
Total	189

- In **Kabwe**, 24 outlets were included in the survey: more than half of them (13) were health facilities located in mission hospitals or health centers. Eight were unlicensed retail stores, and the others were authorized individuals distributing medicines, as well as authorized (community paramedics, etc.) and unauthorized (unlicensed traditional healers). No licensed medicine outlets were surveyed in Kabwe.

- In **Chingola**, the survey involved 48 providers, of which there were 14 health facilities, 14 unlicensed individuals (such as traditional healers), 12 retail outlets (general stores or drug shops), 5 licensed retail medicine outlets (pharmacies), and 3 authorized individuals who were dispensing medicines (community paramedics).

- In **Chipata**, 39 outlets were included in the survey, the majority of which were health facilities (15) or other retail medicine outlets, such as general stores (11), licensed retail outlets, such as pharmacies (7), and authorized individuals dispensing medicines (5), as well as 1 unlicensed individual dispenser.

- In **Lusaka**, 60 providers were included in the survey. Most were licensed medicine retail outlets (20), other retail outlets (18), or health facilities (12). The remaining were either unlicensed individuals dispensing medicines (9) or authorized individuals dispensing medicines (1).

- In **Senanga**, the survey involved 18 providers, most of which were retail outlets other than pharmacies, such as general stores or kiosks (9) or health facilities (6). The other providers were licensed retail medicine outlets (2), and unlicensed individuals dispensing medicines (1). There were no authorized individuals dispensing medicines included in the survey for Senanga.

Table 5 shows the distribution of providers as a percentage of the total sample.

Table 5. Distribution of Provider Sample, by Outlet Type

Outlet Type	Kabwe (n=24)	Chingola (n=48)	Chipata (n=39)	Lusaka (n=60)	Senanga (n=18)	Total (n=189)
Health facility (GRZ, private hospital, mission hospital, or health center)	54%	29%	39%	20%	33%	32%
Licensed retail medicine outlets (pharmacies,)	0%	10%	18%	33%	11%	18%
Other retail outlets (drug shops, general stores, kiosks)	33%	25%	28%	30%	50%	31%
Authorized individuals dispensing medicines (community paramedics)	4%	6%	13%	2%	0%	5%
Other individuals dispensing medicines (traditional healers, unlicensed)	8%	29%	3%	15%	6%	14%

As indicated in Table 5, the majority of providers included in the survey were health facilities in both the rural and urban areas. Authorized individuals dispensing medicines represented only five percent of the sample, although a higher proportion was interviewed in Chipata (13 percent).

Table 6. Level of Training of Respondents at Medicine Outlets

Respondents	Kabwe (n=24)	Chingola (n=48)	Chipata (n=39)	Lusaka (n=60)	Senanga (n=18)	Total (n=189)
Pharmacist	0%	13%	0%	8%	0%	6%
Pharmacy technician	4%	2%	0%	18%	11%	8%
Medical doctor	17%	0%	3%	2%	6%	5%
Paramedic, physician assistant	0%	0%	0%	3%	0%	1%
Nurse, nurse assistant	33%	19%	23%	15%	6%	19%
Clinical officer, medical technologist, lab tech, etc.	4%	4%	8%	3%	6%	6%
None	42%	63%	67%	50%	72%	58%

The level of training of individuals dispensing medication at the medicine outlets is important because it has a major influence on the choice of interventions or medications. Table 6 shows the level of training of the providers at the various medicine outlets surveyed. Of the 189 providers in the medicine outlets surveyed 58 percent reported having had no training. Table 7 shows the level of training by type of outlet; it can be seen that of all medicine vendors surveyed, there were 36 nurses, 15 pharmacy technicians, 11 pharmacists, 9 clinical officers or medical technologists, 7 medical doctors, and 2 paramedics or physician's assistants.

Table 7. Level of Training of Respondents at Medicine Outlets, by Type of Outlet

	HF (n=60)	LD (n=34)	OR (n=58)	AI (n=10)	OI (n=27)	Total (n=189)
Pharmacist	2	7	1		1	11
Pharmacy technician	4	6	5			15
Medical doctor	6		1			7
Paramedic, physician assistant	1	1				2
Nurse, nurse assistant	35	1				36
Clinical officer, medical technologist, lab tech, etc.	6	3				9
None	6	16	51	10	26	109

HF=health facility, LD= licensed dispensing outlet, OR= retail outlet, AI= authorized individual, OI=other individual.

It is important to note that the untrained respondents were found primarily in the retail outlets and were unauthorized individuals selling medicines. However, all of the authorized individuals and half of the respondents in pharmacies lacked some training in pharmacy and clinical care.

Another important factor that influences the health-seeking behavior of caregivers in response to a child presenting symptoms is the proximity of the medicine providers from the nearest health facility. Table 8 presents the analysis of these findings.

Table 8. Distance of Providers from the Nearest Health Facility

Distance	Kabwe (n=11)*	Chingola (n=33)	Chipata (n=24)	Lusaka (n=46)	Senanga (n=17)	Total (n=126)
Under 1 km (or less than 15 minutes walking)	91%	79%	42%	41%	67%	64%
Between 1 and 5 km (up to 1 hour walking)	9%	21%	17%	35%	33%	26%
More than 5 km (more than 1 hour walking)	0%	0%	8%	24%	0%	10%

*Sample excludes health facilities.

According to the results of the analysis, the majority of providers surveyed were less than one kilometer from a health facility. In Kabwe, Chingola, and Senanga, none of the health care providers surveyed were more than five kilometers, or more than a hour's walk from the nearest health facility. In urban Lusaka only 41 percent of the health care providers were under one kilometer, or less than a 15-minute walk from the nearest health facility, while in rural Senanga, 67 percent of the providers were under one kilometer, or less than a 15-minute walk from the nearest health facility.

Results of the Household Survey

The results are presented according to the four points of the framework of appropriate community medicine management—

1. The caregiver recognizes child's symptoms.
2. The caregiver seeks timely care at an appropriate source.
3. The caregiver obtains appropriate medicines.
4. The caregiver uses appropriate medicines correctly in the home, that is, according to an appropriate regimen (dose, frequency, duration).

Although information from the provider and household surveys is complementary, the results are presented separately in this report.

Step 1. The caregiver recognizes the child's symptoms

The information for this step comes only from the household survey. Of the 1,586 parents and guardians responding to this question, 545 (34 percent) thought the child's illness was very serious, or somewhat serious. Slightly fewer, 493 (30 percent), thought the child's illness was not serious. However, of the 139 respondents with children with convulsions, the majority (74 percent) considered the case very serious and some considered it serious (20 percent).

Step 2. The caregiver seeks timely care at an appropriate source

Care Seeking for Cases of Convulsions/Fits

A sign of convulsions in malaria is an emergency that requires immediate medical attention. A total of 59 of the 102 (58 percent) respondents with children who had convulsions sought advice on the same day while 29 of 102 respondents (8 percent) sought advice the following day, presumably as the signs were observed in the night and the respondent sought advice immediately the following morning. Nine respondents (9 percent) reported seeking care two days later and five (5 percent) reportedly did not know. A similar profile was noted for each district.

The majority of the caregivers reported that they only took their child with convulsions outside the home for care (90 of 139 responses or 64 percent), however, 16 of 139 responding caregivers (12 percent) said that when their child had convulsions they treated the child at home without going for care and 31 of the 139 responding caregivers (or 22 percent) said they treated at home and went outside the home for care.

The most popular source of care for children with convulsions was the government health center (75 percent of 87 respondents with convulsions), with the remainder going to private facilities or informal medicine outlets, such as a drug shop. However, as 20 percent of respondents did not know where they went, those going to other facilities were very few (5 cases of 87). While the

numbers in each district are small, in general the profile was similar from district to district as shown in Table 9.

Table 9. Respondents Going Outside Home Who Went to a Specific Source Category as the First Source of Care (Among Respondents with Children with Convulsions/Fits)

Source of Care	Kabwe (n=15)	Chingola (n=3)	Chipata (n=49)	Lusaka (n=2)	Senanga (n=18)	Total (n=87)
Traditional healer	—	—	—	—	—	—
Government health post/subcenter/PHC unit	—	—	—	—	—	—
Government health center or hospital	80%	100%	65%	50%	94%	75%
Private or mission health facility	7%	—	—-	—	—	1%
General store/drug shop	7%	—	2%	—	—	2%
Market	—	—	—	—	—	—
CHW/TBA	—	—	2%	—	—	—
Other	6%	—	2%	—	—	2%
Don't know	—	—	31%	50%	6%	20%

Care Seeking for Cases of Fever/Hot Body

Fever/hot body is considered to be a symptom indicative of malaria. From the respondents (n=1,432), the majority (69 percent) sought care outside of the home, and 18 percent reported that they treated at home and went somewhere for advice. Most districts showed a similar profile, except for the district of Senanga, where 57 percent sought advice outside of the home and 26 percent treated at home as well as going somewhere for advice.

Of the 1,115 respondents with children who had fever, most took the child for care within the first two days: 41 percent the same day the fever started and 41 percent the next day. In three districts: Chingola, Chipata, and Lusaka the majority of caregivers sought advice the next day for cases of fever (47 percent, 55 percent, and 46 percent, respectively), whereas in Kabwe and Senanga the majority (53 percent and 55 percent, respectively) sought care on the same day the fever started. In all districts there were some caregivers who waited until three or more days had passed before seeking treatment (ranging from 11 percent in Senanga to 29 percent in Lusaka).

Table 10 shows that among the 1,174 caregivers who indicated that their children had shown symptoms of fever and hot body, the majority (82.5 percent) indicated the government health center or hospital as the first source of care. Very few reported to have sought care at other sources in the private sector: seven percent went to private clinics, four percent went to general stores or drug shops, and less than one percent went to a pharmacy. Only in three districts (Senanga, Lusaka, and Chipata) did a few respondents (under one percent) mention the traditional healer as the fist source of care for children with fever. Very few caregivers (two percent) reported going to the government health posts or primary health centers (PHCs).

Table 10. Respondents Going Outside Home Who Went to a Specific Source Category as the First Source of Care (Among Respondents with Children with Fever/Hot Body)

Source of Care	Kabwe (n=244)	Chingola (n=237)	Chipata (n=192)	Lusaka (n=282)	Senanga (n=219)	Total (n=1174)
Traditional healer	—	—	0.5%	0.5%	1%	0.5%
Government health post/subcenter/PHC unit	—	1%	—	4%	4%	2%
Government health center or hospital	90%	78%	85%	74%	86%	82.5%
Private or mission health facility	7%	11%	4%	10%	1%	7%
Pharmacy	1%	—	0.5%	0.5%	—	0.5%
General store/ drug shop	1%	7%	5%	5%	1%	4%
Market	—	2%	0.5%	0.5%	6%	2%
CHW/TBA	—	—	3%	3%	—	0.5%
Other	1%	1%	1%	1%	—	1%

Step 3. The caregiver obtains appropriate medicines

Once the caregiver seeks treatment, whether the caregiver obtains appropriate medicines depends on the availability and the affordability of the medicines as well as on the knowledge and practices of the health care providers and medicine sellers. Some of these factors will be presented in the section of the report on the provider findings. The results that are presented in this section are the perceptions of the caregiver on medicine availability, the sources of medicines reported by the caregivers, and the type of treatment provided, such as western medicine or another form of treatment.

Perceptions of Availability

In the household study the perceptions of caregivers about the availability of certain key medicines, unrelated to the child's recent episode of illness, were assessed. The most commonly known name for the medicine was used in order to ensure the caregivers recognition of the medicine (information on this was collected prior to the survey). In general, the majority of caregivers had heard of SP (98 percent of 1,591) and quinine (92 percent of 1,590). Fewer had heard of artemether-lumefantrine (74 percent of 1,590). However, in the districts where artemether-lumefantrine had been introduced on a pilot basis (Kabwe and Lusaka) a higher percentage of caregivers had heard of the medicine (89 percent and 90 percent respectively). Although Chipata was not a province that was implementing an artemether-lumefantrine treatment policy at the time, the vast majority of caregivers (98 percent) had heard of this treatment. Awareness of the medicine was much lower in Senanga (49 percent) and in Chingola (44 percent).

Table 11. Perceptions of Availability of Sulfadoxine-Pyrimethamine, Artemether-Lumefantrine, and Quinine

Perceptions of Availability	SP (n=1558)	Artemether-Lumefantrine	Quinine Tablets	Quinine Injections
Always	48%	2%	19%	20%
Sometimes	36%	9%	36%	36%
Never	5%	20%	18%	20%
I do not know	10%	69%	24%	25%

Table 11 illustrates the caregivers' perceptions of the availability of the first-line and second-line medicines for treatment of malaria. Overall 48 percent of caregivers indicated that SP was always available. This was more or less constant across three districts (Kabwe, Chingola, and Lusaka) at over 50 percent, whereas for Senanga the perception of availability was lower at 39 percent and 32 percent in Chipata.

Although overall a low percentage of respondents (two percent) thought artemether-lumefantrine was always available, it is more important to study the results by district as there was a greater perception of availability in the two districts where the pilot was being implemented: in Kabwe 31 percent of respondents and nine percent in Lusaka considered artemether-lumefantrine to be always or sometimes available. In Chingola eight percent considered artemether-lumefantrine to be sometimes or always available and less than two percent reported this in Senanga and Chipata districts. Overall, 20 percent of respondents recognizing quinine said quinine is always available and an additional 36 percent stated it was sometimes available.

Sources of Medicines Used by Caregivers for Treatment

The household survey investigated where the caregivers obtained their medicines. Of those caregivers who administered certain medicines, some already had them at home, as shown in Table 12. Data from the table show that of all the medicines (n=4,010 medicines) mentioned in the survey the majority were obtained from the government health facilities, with private facilities or drug shops in second place. Pharmacies were not a major source of medicines. Very few caregivers reported that they had the medicines that they administered to their children already in the home. Between the districts there is little variation in the profile, except for in Lusaka, where there is an increased use of private pharmacies and drug shops and in Chingola, where private or mission facilities are used a little more frequently.

Table 12. Sources of Medicines Used by Caregivers

Sources of Medicines	Kabwe (n=657)	Chingola (n=995)	Chipata (n=653)	Lusaka (n=752)	Senanga (n=953)	Total (n=4,010)
Already in home	3%	3%	2%	2%	3%	3%
Traditional healer	1%	1%	1%	0%	1%	1%
Government health facility	76%	74%	81%	66%	84%	76%
Private or mission health facility	6%	12%	2%	7%	0%	6%
Pharmacy	2%	1%	0%	6%	—	2%
General store/drug shop	6%	6%	10%	12%	5%	8%
Market	2%	2%	1%	4%	5%	2%
CHW/TBA	0%	—	2%	—	1%	1%
Other	4%	1%	1%	2%	1%	1%

When this information is extracted for only antimalarials, a similar distribution of sources of medicines used results, that is, primarily the public facilities were used. The source of most of the antimalarials was the government health facility, as reported by 84 percent. Less than five percent of those surveyed already had the medications in the house. One exception was for artemether-lumefantrine, for which 85 percent of 20 respondents in Kabwe district said they had this medicine in the home already. Fifteen percent obtained it from a public health facility, private clinic, or pharmacy.

In general, caregivers obtained the majority of their medicines on the advice of a CHW in a health facility (81 percent, n=4,012). A small percentage of medicines (10 percent) were purchased by the caregivers' own decision, and even fewer were purchased on the advice of a person in shop (five percent). Only two percent of the medicines were purchased on the advice of someone in a private pharmacy.

Most caregivers (95 percent) administered some form of western or modern medicine on the presentation of symptoms of malaria as shown in Table 13. A total of 1,593 caregivers were surveyed.

Table 13. Caregivers Who Gave Western/Modern Medicine

Kabwe (n=304)	Chingola (n=326)	Chipata (n=323)	Lusaka (n=336)	Senanga (n=304)	Total (n=1,593)
98%	97%	99%	96%	84%	95%

Of those who did not give western medicine it was important to see if at least some other appropriate kind of nonmedicine management was provided. The majority (42 percent) of caregivers (n=64) not giving western medicines applied tepid sponging to their child and some

gave traditional herbal teas (22 percent). Almost a third (27 percent) actually did nothing to care for the child at home. The numbers are too small in each district to be able to compare district profiles.

Step 4. The caregiver uses appropriate medicines correctly in the home

The first aspect studied was whether appropriate medicines were used.

Table 14 illustrates the medicines given by caregivers for fever/hot body, convulsions, and fever with convulsions. The results indicate that of all the children in the survey with fever/hot body, only 40 percent (581/1,437) took an antimalarial. Similarly, only 40 percent (32/81) children with convulsions took an antimalarial and 36.8 percent (32/87) of children with both fever and convulsions took an antimalarial. SP, the first-line treatment in most of the districts was taken by only 18.65 percent of children with fever or hot body. This is an important finding and has implications on communication messages to the community on the management of malaria and the need for prompt treatment, particularly in children less than five years of age.

Other medicines reportedly given for the treatment of malaria symptoms were paracetamol, co-trimoxazole (Septrin), amoxicillin, metronidazole (Flagyl), and mebendazole (Vermox).

Twenty-three percent of the caregivers reported that they had been given some kind of injection for their sick child. Fourteen (one percent) respondents indicated receiving a quinine injection, and 65 (four percent) respondents reported using a chloroquine injection.

Table 14. Medicines Given to Children under Five Years with Fever, Convulsions, and Fever and Convulsions, by District

Symptom	Medicine		Kabwe	Chingola	Chipata	Lusaka	Senanga	Total
Fever/hot body	Quinine tablets/drip	n	11	10	6	7	9	43
		%	3.9	3.15	2.28	2.25	3.38	2.99
	Chloroquine syrup	n	13	23	5	14	13	68
		%	4.64	7.26	1.90	4.5	4.88	4.73
	Quinine injection	n	6	2	3	1	2	14
		%	2.1	0.6	1.1	0.3	0.75	0.1
	SP	n	49	58	65	45	51	268
		%	17.5	18.3	24.7	14.47	19.17	18.65
	Chloroquine tablet	n	43	23	19	54	24	163
		%	15.36	7.26	7.22	17.36	9.02	11.34
	Chloroquine injection	n	1	3	3	5	5	17
		%	0.36	0.95	1.14	1.61	1.88	1.18
	Artemether-lumefantrine	n	0	2	6	0	0	8
		%	0	0.63	2.28	0	0	0.56
	Paracetamol	n	97	82	77	93	72	421
		%	34.64	25.87	29.28	29.90	27.07	29.30
	Other	n	55	110	77	91	88	421
		%	19.64	34.7	29.28	29.26	33.08	29.3
	Don't know	n	5	4	2	1	2	14
		%	1.79	1.26	0.76	0.32	0.75	0.97
	Total	**n**	**280**	**317**	**263**	**311**	**266**	**1,437**
		%	100	100	100	100	100	100
Convulsions	Quinine tablets/drip	n	1	0	0	1	1	3
		%	10	0	0	3.45	4.76	3.70
	Chloroquine syrup	n	0	0	1	1		2
		%	0	0	7.69	3.45	0	2.47
	Quinine injection	n	0	0	0	1	1	2
		%	0	0	0	3.45	4.76	2.47
	SP	n	2	0	4	4	5	15
		%	20	0	30.77	13.79	23.8	18.5
	Chloroquine tablet	n	3	0	2	0	1	8
		%	30	0	15.38	0	4.76	9.88
	Chloroquine injection	n	1	0	0	0	1	2
		%	10	0	0	0	4.76	2.47
	Paracetamol	n	3	0	6	10	5	24
		%	30	0	46.15	34.48	23.81	29.63
	Other	n	1	7	0	12	6	25
		%	0	0	0	41.38	28.57	30.86
	Don't know	n	0	0	0	0	1	1
		%	0	0	0	0	4.76	1.23
	Total	**n**	**10**	**8**	**13**	**29**	**21**	**81**
		%	100	100	100	100	100	100

Symptom	Medicine		Kabwe	Chingola	Chipata	Lusaka	Senanga	Total
Fever + convulsions	Chloroquine syrup	n	0	0	1	0	1	2
		%	0	0	2.04	0	5.56	2.30
	Quinine injection	n	0	0	1	0	0	1
		%	0	0	2.04	0	0	1.15
	SP	n	1	1	13	1	3	19
		%	6.67	33.33	26.53	50.00	16.67	21.84
	Chloroquine tablet	n	5	0	2	0	1	8
		%	33.33	0	4.08	0	5.56	9.20
	Chloroquine injection	n	1	0	0	0	1	2
		%	6.67	0	0	0	5.56	2.30
	Paracetamol	n	4	2	13	1	7	27
		%	26.67	66.67	26.53	50.00	38.89	31.03
	Other	n	4	0	9	0	2	24
		%	26.67	0	18.36	0	11.11	27.59
	Don't know	n	0	0	1	0	3	4
		%	0	0	2.04	0	16.67	4.60
	Total	**n**	**15**	**3**	**49**	**2**	**18**	**87**
		%	100	100	100	100	100	100

Table 15 illustrates the specific antimalarials that were given to children by caregivers for those using antimalarials. The majority of caregivers in all the districts either gave SP tablets (46.1 percent) or CQ tablets (28.1 percent) for fever or hot body. None of the cases of fever in the artemether-lumefantrine (Coartem) pilot districts were treated with Coartem, yet 1.7 percent of respondents in Chingola and 5.6 percent in Chipata gave Coartem; neither of which were implementing Coartem as the first-line of treatment. Similarly, the majority of those caregivers administered CQ (31 percent) or SP tablets (43 percent) for the treatment of convulsions/fits. Only one case of convulsions in Kabwe, Lusaka, and Senanga, respectively, was given quinine tablets and one case of convulsions in both Lusaka and Senanga districts was given a quinine injection. Children with convulsions and fever were few, but of those receiving antimalarials (n=32), 59 percent were given SP and 25 percent were given CQ; only one case was given quinine.

Table 15. Caregivers Giving Particular Antimalarials for Malaria Symptoms

Symptom	Medicine		Kabwe	Chingola	Chipata	Lusaka	Senanga	Total
Fever/hot body	Quinine tablets/drip	n	11	10	6	7	9	43
		%	8.9%	8.3%	5.6%	5.6%	8.7%	7.4%
	Chloroquine syrup	n	13	23	5	14	13	68
		%	10.6%	19%	4.7%	11.1%	12.5%	11.7%
	Quinine injection	n	6	2	3	1	2	14
		%	4.9	1.7	2.8	0.8	1.9	2.4
	SP	n	49	58	65	45	51	268
		%	39.8	47.9	60.7	35.7	49	46.1
	Chloroquine tablet	n	43	23	19	54	24	163
		%	35	19	17.8	42.9	23.1	28.1
	Chloroquine injection	n	1	3	3	5	5	17
		%	0.8	2.5	2.8	4	4.8	2.9
	Artemether-lumefantrine	n	0	2	6	0	0	8
		%	0	1.7	5.6	0	0	1.4
	Total	**n**	**123**	**121**	**107**	**126**	**104**	**581**
		%	100	100	100	100	100	100
Convulsions/ fits	Quinine tablets/drip	n	1	0	0	1	1	3
		%	16.7	0	0	10	10	8.6
	Chloroquine syrup	n	0	1	1	0	0	2
		%	0	33.3	16.7	0	0	5.7
	Quinine injection	n	0	0	0	1	1	2
		%	0	0	0	10	10	5.7
	SP	n	2	0	4	4	5	15
		%	33.3	0	66.7	40	50	42.9
	Chloroquine tablet	n	3	1	1	3	3	11
		%	50	33.3	16.7	30	30	31.4
	Chloroquine injection	n	0	1	0	1	0	2
		%	0	33.3	0	10	0	5.7
	Total	**n**	**6**	**3**	**6**	**10**	**10**	**35**
		%	100	100	100	100	100	100
Fever + Convulsions/fits	Chloroquine syrup	n	0	0	1	0	1	2
		%	0	0	5.9	0	16.7	6.3
	Quinine injection	n	0	0	1	0	0	0
		%	0	0	5.9	0	0	0
	SP	n	1	1	13	1	3	19
		%	14.3	100	76.5	100	50	59.4
	Chloroquine tablet	n	5	0	2	0	1	8
		%	71.4	0	11.8	0	16.7	25
	Chloroquine injection	n	1	0	0	0	1	2
		%	14.3	0	0	0	16.7	6.3
	Total	**n**	**7**	**1**	**17**	**1**	**6**	**32**
		%	100	100	100	100	100	100

Studying how soon after the illness the medicines were administered, it was found that the majority of medicines were administered on the same day (40 percent) or the next day (32 percent), with a slightly higher tendency in the rural district of Senanga (51 percent of medicines on the first day and 26 percent on the next day) and a slightly lower tendency in Lusaka (31 percent on the first day and 32 percent on the next day).

Table 16 shows the timing of administration of the first- and second-line treatment of malaria by caregivers. A high percentage of respondents reported using SP (50 percent), but less than half (34 percent) of those administering SP gave it the same day. Sixty-six percent of respondents started taking SP the same day of or the day after onset of illness, but an alarming 34 percent of respondents waited two or more days after the onset of symptoms before taking SP. Given the high fatality rate of untreated *P. falciparum* malaria, this statistic reveals an important gap in knowledge or information.

Table 16. Timing of Administration of Medication by Caregiver

Timing	SP (n=798)	Chloroquine Injection (n=64)	Chloroquine Tablets (n=581)	Quinine Tablets (n=127)	Quinine Injections (n=14)	Artemether-Lumefantrine (n=20)
Same day	34%	31%	45%	44%	36%	45%
Next day	32%	25%	33%	22%	0%	25%
Two days after illness started	17%	14%	12%	13%	7%	20%
Three or more days after illness started	17%	30%	10%	20%	57%	10%

CQ was the medication of choice for 36 percent of respondents; on obtaining the medicine 45 percent took CQ tablets on the same day, 33 percent took the medication the following day, and 12 percent took the medication on the third day. Only one third (30 percent) of the respondents had the injection administered on the same day. Patients treated with CQ injections, like those treated with other medications, failed to seek early treatment: only about 55 percent of respondents received injectable CQ on the day of or the day after the onset of symptoms. Another 43 percent of respondents did not receive treatment until two or more days after the onset of symptoms. As with other medications, an alarmingly high number of caregivers reported administering the quinine two or more days after the illness started—this included 33 percent of those who reported taking quinine tablets and 64 percent of those who reported taking quinine injections. Thirty-six percent of the respondents had the injection administered on the same day. Artemether-lumefantrine was recently made the first-line treatment for malaria in the two pilot districts (Kabwe and Lusaka) and so there were few cases overall given the treatment. However, of the few cases given artemether-lumefantrine, 70 percent received it on the same day or day after the onset of symptoms.

In order for caregivers to be able to administer the medicines appropriately, the appropriate information must be effectively communicated. Verbal information can be given and in fact was for 90 percent of the medicines obtained, according to the caregivers, with little variation

between the districts. The medicines were observed where possible in the interview and packaging and components of labeling were noted.

Since 54 percent of the medicines were obtained outside of the manufacturers packaging, such as loose tablets in a plastic package, it is even more important to ensure that the medicines are labeled appropriately. Table 17 shows the components of information as observed on the labels of all the medicines in the household survey.

Table 17. Components of Labeling on Medicines, by District

Information	Kabwe	Chingola	Chipata	Lusaka	Senanga	Total
Medicine's name	89% (n=657)	92% (n=1,003)	83% (n=656)	92% (n=756)	89% (n=953)	89% (n=4,025)
Dose	84% (n=655)	77% (n=962)	82% (n=656)	90% (n=738)	87% (n=953)	84% (n=3,964)
Frequency	82% (n=652)	55% (n=896)	77% (n=658)	91% (n=734)	86% (n=953)	78% (n=3,891)
Duration of treatment	73% (n=658)	46% (n=808)	67% (n=656)	72% (n=707)	85% (n=953)	69% (n=3,774)

Table 18. Percentage of Packages of Antimalarials Labeled with the Correct Elements

Elements	SP (n=800)	Artemether-lumefantrine (n=20)	Chloroquine Tablets (n=582)	Quinine Tablets (n=128)
Name	87%	95%	93%	81%
Dose	79%	95%	86%	75%
Frequency	70%	90%	80%	69%
Duration	61%	85%	73%	67%

Table 18 shows the results of the antimalarial label survey. Although the trend is similar, it can be seen that, in particular for SP and quinine, the frequency and duration information was less often recorded on the label. Labeling of artemether-lumefantrine was good for all the components of information. This analysis does not evaluate the accuracy of this information on the labels.

In general, CQ and SP were actually administered by the caregivers to the child for the correct duration, but quinine was administered for less than the required seven days in 85 percent of cases, as shown in Table 19. Although the sample of those administering artemether-lumefantrine was small (n=20), there was a percentage (35 percent) of caregivers that administered the medicine for longer than the required three days. Almost all of the caregivers reported that they had been given instructions on how to give the medicine

Table 19. Medication Administration Properly Adhered to by Respondents

Name of Medication	Duration of Dosing			Received Instruction on how to Administer the Medicine
	Correct	Too Short	Too Long	
SP (n=800)	87%	—	13%	95%
Artemether-lumefantrine (n=20)	50%	15%	35%	90%
Quinine tablets (n=128)	6%	85%	9%	88%
Chloroquine tablets (n=582)	74%	12%	14%	90%

Results of the Provider Survey

Actual Availability

A list of tracer medicines was used to evaluate the availability of specific medicines in the different types of medicine outlets surveyed. This list included key first- and second-line medicines for malaria.

From Table 20 it is seen that most medicine outlets had SP in stock at the time of the visit in the majority of the districts. However, Senanga district showed a low availability of SP for all the medicine outlets together. Only a few outlets (less than 10 percent) had artemether-lumefantrine in stock. Artemether-lumefantrine was not available in the outlets of two districts surveyed—Kabwe and Senanga—despite Kabwe being one of the pilot districts for implementation of artemether-lumenfantrine at the time of the survey. But artemether-lumenfantrine was found to be available in Lusaka, Chipata, and Chingola, even though only Lusaka was part of the pilot at the time of the survey. Quinine was available at about half of all the outlets for all districts together, although it was less available in Chingola and Senanga (33 percent in each).

Table 20. Availability of Specific Medicines at All Medicine Outlets, by District

	Kabwe (n=24)	Chingola (n=48)	Chipata (n=39)	Lusaka (n=60)	Senanga (n=18)	Total (n=189)
SP	79%	69%	62%	85%	44%	71%
Artemether-lumefantrine	0%	2%	8%	20%	0%	8%
Quinine	62%	33%	46%	57%	33%	47%
Paracetamol	83%	98%	100%	82%	94%	91%
Chloroquine	67%	71%	92%	82%	83%	79%

It is important to study the availability of certain medicines by outlet type, as certain types of outlets should not stock certain medicines. Table 21 shows the wide variation of medicine availability between medicines and across outlets.

Table 21. Antimalarials Stocked, by Type of Outlet

Antimalarials	Health Facility (n=60)	Licensed Medicine Outlet (n=34)	Retail Outlet (n=58)	Authorized Individual (n=10)	Unauthorized Individual (n=27)
SP	87%	71%	62%	40%	70%
Artemether-lumefantrine	13%	18%	5%	0%	0%
Quinine	87%	38%	28%	0%	30%
Paracetamol	93%	94%	86%	100%	89%
Chloroquine	67%	79%	84%	100%	89%

Generally, SP was available in all types of outlets except the authorized individuals (although this was a smaller sample). Artemether-lumefantrine was available in Lusaka in 5 of 12 health facilities and 6 of 20 licensed retail outlets (pharmacies) and in 1 of 18 drug shops. Artemether-lumefantrine was also available in two districts not participating in the artemether-lumefantrine implementation at the time of the study: in 3 of 15 health facilities in Chipata and in 1 of 12 drug shops in Chingola. Quinine was predominantly available in health facilities where there was a good availability; it was available to a lesser extent in the pharmacies and drug shops. None of the authorized individuals were found to have any quinine, although 30 percent of the unauthorized medicine sellers stocked quinine. CQ was available in most types of outlets, although it was no longer a treatment of choice at the time of the survey.

Providers' Knowledge of Symptoms of Childhood Malaria

During the assessment of the provider knowledge, providers were asked to identify the symptom of childhood malaria. A hypothetical scenario of a two-year-old suffering from malaria was presented. The most common symptoms of mild malaria in a two-year-old are fever/hot body and vomiting. Less than half of the providers in all districts (average 28 percent ranging between 25 to 31 percent) were able to identify fever/hot body as a symptom of malaria and around one fifth (18 percent) identified vomiting as a sign of mild malaria. Other symptoms mentioned included headache (15 percent of providers) and refusal to eat (12 percent), as shown in Table 21. Little difference is noted between districts, as shown in Table 22.

Table 22. Providers' Knowledge of Symptoms That Can Be Found in a Two-Year-Old Suffering from Mild Malaria

Symptoms	Kabwe (n=77)	Chingola (n=127)	Chipata (n=113)	Lusaka (n=230)	Senanga (n=61)	Total (n=608*)
Headache	9%	14%	18%	17%	8%	15%
Fever (hot body)	30%	31%	30%	25%	28%	28%
Vomiting	18%	13%	19%	20%	21%	18%
Child refuses to eat	5%	11%	11%	15%	11%	12%

*n is the number of symptoms reported not the number of outlets.

The severity of malaria will also indicate the urgency with which it should be treated. A few providers recognized convulsions/fits (10 percent) as symptoms for distinguishing mild (or "simple") from severe malaria in children, as shown in the Table 23. Lethargy can also be another symptom that differs between mild and severe malaria.

Table 23. Symptoms Differentiating Mild from Severe Malaria, by District

Symptoms	Kabwe (n=66)	Chingola (n=117)	Chipata (n=128)	Lusaka (n=205)	Senanga (n=86)	Total (n=602*)
Convulsion/fits	11%	11%	19%	5%	8%	10%
Child is lethargic	8%	15%	9%	2%	6%	7%

*n is the number of symptoms reported not the number of outlets

Table 24. Symptoms Differentiating Mild from Severe Malaria, by Type of Outlet

Symptoms	Health Facility (n=60)	Licensed Medicine Outlet (n=34)	Retail Outlet (n=58)	Authorized Individual (n=10)	Unauthorized Individual (n=27)	Total (n=189)
Convulsion/fits	57%	29%	21%	40%	4%	32%
Lethargy	42%	21%	17%	10%	4%	23%

It is more useful to study the providers' knowledge by type of outlet, as those in the health facilities should have been trained in differentiating mild from severe malaria. However, as can be seen in Table 24, even in health facilities only about half of the providers mentioned the key symptoms for differentiating between mild and severe malaria. Moreover, the other types of providers (including supposedly trained providers in pharmacies, drug shops, as well as authorized individuals) performed even worse with approximately one third or fewer mentioning the relevant symptoms.

Providers' Knowledge of Treatment Options

Providers were assessed on their knowledge of the most effective medicine to treat childhood malaria as well as their knowledge of the national treatment guidelines for childhood malaria.

More than half of the providers assessed (52 percent) identified SP as the most effective medicine to treat childhood malaria (Table 25). A high proportion (41 percent) also considered CQ to be an effective medicine to treat childhood malaria. In Kabwe, where there had been a pilot implementation of artemether-lumefantrine, only 8 percent (two respondents in health facilities) identified it as the most effective medicine to treat malaria while a higher proportion (30 percent) considered CQ (syrup or tablets) to be the most effective medicine to treat malaria.

Table 25. Providers' Knowledge of the Most Effective Medicine to Treat Malaria, by District

Medicines	Kabwe (n=24)	Chingola (n=43)	Chipata (n=39)	Lusaka (n=48)	Senanga (n=16)	Total (n=170)
Chloroquine syrup	13%	9%	13%	6%	6%	9%
Panadol	4%	2%	5%	0%	0%	2%
SP	58%	58%	41%	56%	38%	52%
Chloroquine tablet	17%	26%	41%	29%	50%	31%
Chloroquine injection	0%	2%	0%	0%	0%	1%
Artemether-lumefantrine	8%	0%	0%	0%	0%	1%

When these practices are studied by outlet type, all outlets, including the unauthorized sellers, consider SP to be the most effective medicine for mild malaria in children (Table 26). A number of respondents at all types of facilities, including government health facilities, still perceived CQ to be the most effective treatment for childhood malaria.

Table 26. Providers' Knowledge of the Most Effective Medicine to Treat Malaria, by Type of Outlet

Medicines	Health Facility (n=58)	Licensed Medicine Outlet (n=26)	Retail Outlet (n=53)	Authorized Individual (n=10)	Unauthorized Individual (n=17)
Chloroquine syrup	1 1%	2 8%	11 21%	—	2 12%
Panadol	—	1 4%	2 4%	—	1 6%
SP	40 69%	13 50%	19 36%	7 70%	9 53%
Chloroquine tablet	15 26%	10 38%	20 38%	3 30%	5 29%
Chloroquine injection	—	—	1 2%	—	—
Artemether-lumefantrine	2 3%	—	—	—	—

In addition to the effectiveness of the antimalarial, it is important for providers to know what is recommended by the national treatment guidelines. As shown in Table 27, the profile reflects providers' knowledge of effective antimalarials—most providers (66 percent) knew that the first-line treatment was SP. However, in the two districts that had been implementing artemether-lumefantrine, the majority of providers still thought the recommended treatment was SP. Only in Kabwe, where CHWs in the public sector had received orientation in February 2003 on the new policy, nine percent of respondents were aware of the new treatment guidelines. Despite the

policy change to SP 27 percent of respondents still thought CQ in some form was the recommended medicine for treating mild malaria in a two-year-old child.

Table 27. Providers' Knowledge of Recommended Medicines on National Treatment Guidelines for a Two-Year-Old with Mild Malaria, by District

Medicines	Kabwe (n=22)	Chingola (n=42)	Chipata (n=39)	Lusaka (n=54)	Senanga (n=16)	Total (n=173*)
SP	68%	78%	54%	61%	69%	66%
Chloroquine tablet/syrup	14%	17%	47%	20%	31%	26%
Chloroquine injection	0%	2%	0%	0%	0%	1%
Quinine	0%	0%	0%	4%	0%	1%
Artemether-lumefantrine	9%	0%	0%	0%	0%	5%

*Please note that the total does not add up to 189 medicine outlets because representatives in some medicine outlets did not respond to this question or responded that they did not know.

Breaking this information down by type of outlet can target the level at which the problems are found. It can be seen from Table 28 that the majority of providers at health facilities (78 percent) were aware that the recommended treatment for the treatment of uncomplicated malaria for a two-year-old was SP. Less than half of the providers in licensed medicine outlets (47 percent) and retail outlets (44 percent) were aware of this recommendation. Despite the change in first-line treatment policy, over a third of respondents in licensed medicine outlets, retail outlets, and authorized individuals named CQ as the recommended first-line of treatment.

Table 28. Providers' Knowledge of Recommended Medicines on National Treatment Guidelines for a Two-Year-Old with Mild Malaria, by Type of Outlet

Medicines	Health Facility (n=60)	Licensed Medicine Outlet (n=34)	Retail Outlet (n=58)	Authorized Individual (n=10)	Unauthorized Individual (n=27)	Total (n=189)
SP	78%	47%	44%	60%	67%	60%
Chloroquine tablet/syrup	12%	35%	31%	40%	18%	24%
Chloroquine injection	0%	3%	0%	0%	0%	0.5%
Quinine	0%	6%	0%	0%	0%	1%
Artemether-lumefantrine	5%	6%	5%	0%	0%	4%

Sales Practices

As a measure of practice rather than knowledge, respondents at the medicine outlets were asked to mention the medicines most frequently purchased or sold for the treatment of malaria in

children. Table 29 shows that consistent with the knowledge results, the medicines that are sold the most are SP (60 percent) and some form of CQ (33 percent). The sale of artemether-lumefantrine was limited to Kabwe district and to a small number of respondents (13 percent).

Table 29. Medicine that Caregivers Buy or Receive for a Child with Mild Malaria, by District

Medicines	Kabwe (n=24)	Chingola (n=45)	Chipata (n=38)	Lusaka (n=60)	Senanga (n=17)	Total (n=184*)
Quinine tablets	0%	0%	3%	0%	6%	12%
SP	67%	81%	34%	64%	47%	60%
Chloroquine syrup	8%	4%	29%	15%	24%	15%
Chloroquine tablets	4%	13%	32%	15%	24%	17%
Chloroquine injection	4%	0%	0%	0%	0%	1%
Artemether-lumefantrine	13%	0%	0%	0%	0%	2%
Panadol	0%	2%	0%	0%	0%	1%
Aspirin	0%	0%	3%	0%	0%	1%

*Please note that the total does not add up to 189 medicine outlets because representatives in some medicine outlets did not respond to this question or responded that they did not know, these were therefore not added to the final calculation.

In analyzing this data by type of outlet, it can be seen from Table 30 that in general all types of medicine outlets are selling SP more than CQ. Artemether-lumefantrine was restricted to the health centers and one drug shop in Kabwe district. The private outlets appear to be selling CQ slightly more often than the government facilities. Of note is the fact that the unauthorized vendors state that they sell more SP than other medicines.

Table 30. Medicines that Caregivers Buy or Receive for a Child with Mild Malaria, by Type of Outlet

Medicines	Health Facility (n=59	Licensed Medicine Outlet (n=36)	Retail Outlet (n=55)	Authorized Individual (n=10)	Unauthorized Individual (n=26)
Quinine tablets	2%	—	2%	—	—
SP	68%	47%	56%	50%	65%
Chloroquine syrup	10%	23%	13%	30%	12%
Chloroquine tablets	14%	22%	20%	20%	12%
Chloroquine injection	2%	—	—	—	—
Artemether-lumefantrine	3%	—	2%	—	—
Panadol	—	—	—	—	4%
Aspirin	1%	—	—	—	—

Appropriate Medicine Use

Whether a caregiver administers medicines correctly may depend on whether they are given instructions and the quality of those instructions, and whether the package is labeled with dosing information.

Verbal Explanation on Medicine Administration

The survey assessed the providers' knowledge of what should be explained to the patient/caregiver. Most respondents believed that the patient should be told how to take his/her medicine. The results are presented in Table 31.

Table 31. Percentage of Respondents Who Said What Should be Explained to the Patient/Caregiver, by District

Explanation	Kabwe (n=24)	Chingola (n=48)	Chipata (n=39)	Lusaka (n=60)	Senanga (n=18)	Total (n=189)
Medicine name	21%	40%	31%	58%	72%	44%
Medicine action	41%	42%	20%	70%	83%	49%
When and how to take	75%	71%	82%	97%	100%	85%
Side effects	71%	58%	51%	68%	67%	62%
Other	54%	27%	10%	15%	17%	22%

Most of the providers indicated that some verbal explanation should be given to the patient or caregiver. The elements of an ideal verbal explanation were not provided for the respondents so as to not bias the answer. Of the 189 providers surveyed, 44 percent indicated that the medicine name is something that should be explained to the patient and 49 percent mentioned the medication action. The percentage of respondents who stated that side effects should be explained to the patient varied from 51 percent in Chipata to 71 percent in Kabwe.

Table 32 shows elements of information that should be explained to the client. In general the information was more complete at the health facility level, but only 43 percent of respondents at the health facility mentioned explaining what the medicine does, which was similar to the level of unauthorized sellers. There is not a great difference between the types of providers in terms of their recognition of the information that should be verbally communicated to customers.

Table 32. Percentage of Respondents Who Said What Should be Explained to the Patient/Caregiver, by Type of Outlet

Explanation	Health Facility (n=60)	Licensed Medicine Outlet (n=34)	Retail Outlet (n=59)	Authorized Individual (n=10)	Unauthorized Individual (n=27)
Medicine name	53%	50%	34%	50%	37%
Medicine action	43%	70%	46%	40%	41%
When and how to take	83%	91%	88%	80%	70%
Side effects	73%	73%	49%	80%	44%

Knowledge of Elements of Written Labeling

Respondents were asked to list the elements that should be included on a label once a medicine is dispensed to assess their knowledge of good labeling practices (Table 33).

Table 33. Respondents Reporting Specific Elements To Be Written on the Package Label of a Medicine as It Is Dispensed, by District

Elements on Label	Kabwe (n=24)	Chingola (n=48)	Chipata (n=39)	Lusaka (n=60)	Senanga (n=18)	Total (n=189)
Patient's name	17%	23%	10%	8%	22%	17%
Medicine name	91%	75%	85%	95%	94%	87%
When and how to take	92%	85%	95%	97%	100%	93%
Duration	79%	67%	82%	83%	100%	80%

Most of the 189 respondents surveyed did not think a patient's name needed to be written on the package label: only 17 percent of respondents considered the name important. In direct contrast, 87 percent of respondents reported that the medicine name should be written on the package label and 93 percent reported that instructions on how to take the medicine should be written on the package label. Eighty percent of all respondents reported that the duration of the medication administration should be written on the package label. Rural Senanga had the highest proportion of providers with adequate knowledge of dosing requirements. All 189 providers surveyed said that instructions on how to take the medicine and how long to take the medicine for should be written on the label. Chingola had a lower proportion of providers with adequate knowledge of all the elements of labeling, especially regarding the duration of the treatment.

Breaking the information down by type of outlet illustrates that knowledge of good labeling is not only limited to the government facilities but even the retail outlets and the unauthorized sellers know most of the elements of good labeling (Table 34).

Table 34. Respondents Reporting Specific Elements to be Written on the Package Label of a Medicine as it is Dispensed, by Type of Outlet

	Health Facility (n=60)	Licensed Medicine Outlet (n=34)	Retail Outlet (n=59)	Authorized Individual (n=10)	Unauthorized Individual (n=27)
Patient's name	27%	8%	7%	30%	7%
Medicine name	92%	94%	86%	90%	67%
When and how to take	93%	100%	93%	100%	77%
Duration	83%	91%	78%	100%	56%

Dispensing Practices of Providers

The previous results show that in general the providers' *knowledge* of good dispensing practices was adequate. Where there was a sale of medicine in the outlet at the time of the interview, the exchange was observed and the *actual* dispensing practices were recorded (Table 35).

Table 35. Dispensing Procedures Observed by Providers in Medicine Outlets

Indicators	Health Facility (n=27*)	Licensed Medicine Outlet (n=15)	Retail Outlet (n=25)	Authorized Individual (n=4)	Unauthorized Individual (n=11)	Total (n=82)
1. Tablets dispensed outside of the manufacturer's pack	13/51	7/28	18/39	0/8	10/17	48/143 34%
2. Small bottles with cap	5/36	0/12	2/30	0/4	1/16	8/98 8%
3. "Plastic packages" or "minigrip" sachets	13/36	5/12	12/30	0/4	5/16	35/98 35%
4. Sealed envelopes	2/36	0/12	4/30	0/4	2/16	8/98 8%
5. Folded paper envelopes	1/36	1/12	3/30	0/4	2/16	7/98 7%
6. Several tablets dispensed in the same package	3/60	2/34	3/58	0/10	1/27	9/189 5%
7. Syrups dispensed outside manufacturer's packaging	13/60	3/34	4/58	1/10	4/27	25/189 13%
8. Small airtight bottles with caps	10/13	2/3	4/4	0/1	4/4	20/25 80%
9. Small bottles without caps	2/13	0/3	0/4	0/1	0/4	2/25 8%
10. Verbal instructions on how to use the medicine given to the patient	28/60	16/34	21/58	5/10	7/27	77/189 41%

* The n here is the number of observations, but as several medicines were sold in one observation the denominator is not larger than the n.

Although the sample of observations was not large, enough information was collected to show that there was no consistent dispensing of medications, as shown in Table 35. Tablets were dispensed out of the original packaging in all types of outlets. The most frequent type of packaging to be used for the tablets was plastic minigrip sachets, although this was more common in the government health facilities than in the other outlets. Few outlets used small bottles with caps. A very small, but to be noted, number of outlets (five percent) packed more than one type of tablets into a single package. In 13 percent of observations, syrups were dispensed in packaging different from the original manufacturer's packaging, but the majority of these were dispensed in other airtight bottles with caps. In the observed sales, 41 percent of providers gave verbal instructions on how to use the medicines.

DISCUSSION

The application of the C-DMM assessment tool demonstrated that caregivers generally seek care outside of the home for cases of fever, but less in rural areas, possibly due to more limited access to services, as a slightly higher proportion of caregivers used treatment at home. This was noted to be in a timely manner and the most frequent source of treatment was the government health facility. Private clinics and pharmacies or drug shops were hardly used for cases of fever. The government health posts are not frequented either, probably due to their limited numbers and accessibility. This was true for treatment seeking for both uncomplicated and severe malaria. This information indicates that any intervention focusing on improving quality of services for malaria management should focus on the public sector facilities for greatest impact, as that is where most caregivers go. Even in urban Lusaka, pharmacies and private clinics were not widely frequented.

While caregivers recognized the signs of malaria and severe malaria and perceived the symptoms to be serious, the findings indicated that the majority of caregivers did not give the children an antimalarial. Similarly, less than half of the children with convulsions or convulsions with a fever took an antimalarial.

Caregivers were widely aware of SP as an antimalarial, but awareness of artemether-lumefantrine was limited to the pilot areas (Kabwe and Lusaka). There was a perception that SP was not widely available as only about 50 percent of caregivers felt it was always available in their area, which indeed is reflected in the provider survey showing that only about 70 percent of the outlets surveyed had SP available. Artemether-lumefantrine was not perceived to be very readily available in the pilot districts. Most caregivers know of quinine but less than half feel it is widely available, which is in keeping with the actual availability data form the outlet; quinine was only available in less than half the outlets surveyed.

SP was widely available across all types of outlets in all districts. It was noted that CQ was also available in most outlets in all districts, which does not discourage its use. Artemether-lumefantrine was not available in one district where it was supposed to be implemented (Kabwe), and it was found in a limited number of private and public outlets in two districts where artemether-lumefantrine was not yet introduced, indicating possible leakage from the other districts.

Most caregivers obtained their medicines from government health facilities and the majority of medicines were obtained on the advice of the CHW. This shows the importance of ensuring that the medicines are available at these facilities, CHWs are knowledgeable and competent, and the current treatment guidelines are implemented to improve the quality of malaria management in children. From the provider survey it can be seen there were some deficiencies in the recognition of symptoms of malaria and differentiating between mild and severe malaria. Even at the health facility level, only about half mentioned convulsions or lethargy to differentiate the severity; other providers performed more poorly. However, most providers knew that SP was the first-line treatment for malaria, although in the pilot districts for artemether-lumefantrine there was still some confusion among the providers—few mentioned artemether-lumefantrine as the

recommended or effective treatment. Knowledge of the medicine of choice according to the national treatment guidelines for malaria is limited to the staff at health facilities. In other types of outlets CQ was still thought to be the first-line treatment by many respondents. A number of providers were reported to have no training and about half of these were found in the pharmacies. Continuous in-service training is imperative to ensure continued quality of care at health facilities.

Overall about half the children were treated with SP and just under half of the caregivers administered CQ to their children when they had malaria. Use of artemether-lumefantrine was low in the pilot districts probably due to its poor availability. The majority of children that took SP were given it within two days; however, about a third still waited two or more days after the onset of symptoms before administering SP. While the timeliness of administering medicines was generally good, WHO recommends that prompt diagnosis and treatment within 24 hours as a key cornerstone of malaria management.

Most of the medicines are labeled as observed in the household survey, although fewer are labeled with information on the duration of treatment. This is not such an issue with SP as it is a single treatment, but for treatment with artemether-lumefantrine that lasts 3 days, this is important information to be communicated. Most providers seem knowledgeable on the aspects of information that need to be communicated to caregivers, although they do not always put it into practice. Less than half of the providers gave verbal explanations to clients on observation. Poor labeling and inadequate communication to clients contributes to problems with caregivers administering the medicine correctly, as seen in cases involving quinine, where the majority of caregivers administer the medicine for less than seven days and for artemether-lumefantrine where a third of caregivers administered the medicine for longer than the required three days. As the treatment policy moves away from CQ and SP, it will be even more important to ensure that medicines are clearly labeled, providers give clear instructions, and that the caregivers understand the instructions on how to give the medicines to their child. Wide availability of appropriately prepackaged material by age group as well as other methods (for example, plastic minigrip sachets) would facilitate the labeling of medicines.

Widescale IEC campaigns on the need for timely treatment for the symptoms of malaria as well as the current government recommendation as the first-line of treatment will be essential for the successful implementation of the change in treatment policy. Mechanisms to ensure a reduced demand for CQ will contribute to it being effectively phased out.

SUMMARY OF FINDINGS AND RECOMMENDATIONS

Strengths/Opportunities	Limitations	Recommendations
• Recognition of convulsions by caregivers as serious • Appropriate source of care sought in a timely manner for children with convulsions and fever	• Delay by some caregivers in giving SP for malaria • Inadequate recognition of symptoms of malaria and how to differentiate between mild and severe by providers particularly in private sector • Inadequate treatments used to treat malaria • Under half of children with signs of malaria treated with an antimalarial	• IEC and behavior change interventions in community, through CHWs and/or private providers: drug shops to promote early recognition of symptoms and treatment • Continued training in public sector • Training of private providers, using job aids and other materials. • Posters for providers and their clients
New treatment policy with artemether-lumefantrine adopted and being implemented	Caregivers still using old treatment regimens, such as SP and CQ	• Continued dissemination of new protocol and training in public sector • Orientation of private providers and dissemination of protocol • Training of pharmacy sales staff • Message communication to the community: radio, CHWs, etc., on awareness of correct medicine and dosing
Public health facilities well frequented by caregivers	• Low use of private sector (pharmacies and drug shops) • Low use of government health posts • Some caregivers reported keeping artemether-lumefantrine in home	• Training in public sector on new protocol to ensure appropriate malaria management • Facilitate availability of artemether-lumefantrine in private sector at affordable prices • Ensure quality services and availability of appropriate medicines in private sector: through accreditation scheme or incentives or contracting • IEC with communication materials to community to promote use of appropriate sources of medicines: public facilities, private pharmacies, and drug shops; discourage storage of artemether-lumefantrine at home

Strengths/Opportunities	Limitations	Recommendations
Reasonable availability of SP (70 percent)	• Low perception of availability of SP and artemether-lumefantrine (two first-line treatments in different districts) • Low availability of artemether-lumefantrine • Chloroquine still widely available	• Improve distribution of medicines in the public sector: training in store management, SOPs and store management tools, regular supervision • Ensure availability of artemether-lumefantrine at central and regional level • Withdraw stock of chloroquine • Promote availability of artemether-lumefantrine in private sector as above • IEC with materials to community about availability and use of artemether-lumefantrine
• Of those children treated with an antimalarial, more received SP than CQ • Caregivers obtain medicines on the advice of CHWs • Reasonable knowledge of use of SP for malaria by providers	• Low use of antimalarials for children with symptoms of malaria • Just under half the cases of fever treated with antimalarials were given SP • Use of CQ still relatively high • Low use of artemether-lumefantrine in districts where it was being implemented • Some inappropriate use of injections (quinine and CQ)	• Continued dissemination of new protocol and training in public sector • Orientation of private providers and dissemination of protocol
• Providers have good knowledge of the elements of information to be provided to the caregiver both written and verbal • Most medicines are labeled with the necessary elements of information • CQ and SP in general were administered correctly to the children	• Dispensing is inconsistent and often inadequate • Packaging is inappropriate and sometimes tablets are even mixed • Quinine and artemether-lumefantrine were not administered to the children for the correct duration	• Continued dissemination of new protocol and training in public sector • Orientation of private providers and dissemination of protocol • Development of SOPs for dispensing and counseling and training and supervision for their introduction • Ensure that dispensing materials are available in the supply chain: plastic sachets • Use of prepackaged medicines

REFERENCES

Central Board of Health (CBOH)/National Malaria Control Center (NMCC). 2001a. *Malaria Treatment Policy*. Lusaka: Government of Zambia.

CBOH/NMCC. 2001b. *Strategic Plan for Rolling Back Malaria in Zambia: 2001–2005*. Lusaka: Government of Zambia.

Dlamini, Q. Q., L. Lush, M. Auton, and P. Nkandu. 2004. *Impact of Public-Private Partnerships Addressing Access to Pharmaceuticals in Low and Middle Income Countries: Zambia*. Geneva: The Initiative on Public-Private Partnerships for Health, Global Forum for Health Research.

Ministry of Health (MOH). 2004. *Integrated Treatment Guidelines for Frontline Health Workers*. Lusaka: Government of Zambia.

MOH/CBOH. 2002. *Standard Treatment Guidelines.* Lusaka: Government of Zambia.

Nachbar, N., J. Briggs, O. Aupont, et al. 2003. *Community Drug Management for Childhood Illness: Assessment Manual*. Submitted to the U.S. Agency for International Development by the Rational Pharmaceutical Management Plus Program. Arlington, VA: Management Sciences for Health.

World Health Organization (WHO). 1999. *Framework for developing, implementing and updating antimalarial treatment policy in Africa: A guide for country malaria control programmes*. World Health Organization Regional Office for Africa.

OTHER RESOURCES

CBOH. 1998. *Zambia National Formulary: 1998–2001*. Lusaka: Government of Zambia

CBOH. 2002. *Framework for Developing, Implementing, and Updating Antimalaria Treatment Policy Change in Zambia*. Lusaka: Government of Zambia.

ANNEX 1. LIST OF COLLABORATORS

Supervisors

1.	Eva M. Mpheze Wonani	Kabwe Dhmt
2.	Kolala I. Mulenga	Kabwe Dhmt
3.	Tembo Elijah	Chipata Dhmt
4.	M. Mushiba	Senanga Dhmt
5.	F. Kaingu	Senanga Dhmt
6.	M. Kasonde	Lusaka Dhmt
7.	R. Kasoma	Lusaka Dhmt
8.	M. Chileshe	Lusakasa Basic School

Trainers

9.	Caroline Yeta	CBOH–PHO
10.	Caesar Mudondo	NMCC
11.	Dr. Nawa Sipilanyambe	NMCC
12.	Oliver Hazemba	MSH

Data Collectors

13.	Matumbo Mundia	Burma Road Basic School
14.	Muleta Misheck	Mahatma Gandhi Basic School
15.	Joyce Mainza	Kamwala Basic School
16.	Lillian Amukena	Woodlands “A” Basic School
17.	Anthony Chiwambo	Burma Road Basic School
18.	Athanasias Matanga	Kamwala South Basic Scool
19.	Loveness Mwitwa Mulimbika	Chilenje Basic School
20.	Edward Ndhlovu	Kabwata Basic School
21.	Evelyn Kazoka	Zambia Basic School
22.	Kanyama Raphael	Kabwata Basic School
23.	Judy Kabuku	St. Patrick’s School
24.	Betty Malosa	St. Patrick’s Basic School
25.	Lucy Daka Mudeene	Kabwata Basic School
26.	Justina Mvula	Kabwata Basic School
27.	Mary Joan Nkwemu	Kabwata Basic School
28.	Peggy Katambi	Chingola District Health Board
29.	Eustakia Nkwemu	Munkolo Basic School
30.	Frank Mwaala	University of Zambia
31.	Ngala H. Rex	Nangongide Basic School